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The Krugman-Macedo Diagram Revisited

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1. Introduction

Forty years have passed since Jorge Braga de Macedo and Paul Krugman published "The Economic Consequences of the April 25 Revolution" (Krugman and Macedo 1979). In that article, the authors analysed the macroeconomic developments in Portugal, starting from the years that preceded the 1974 Revolution until the completion of the first stand-by arrangement negotiated in 1977 with the International Monetary Fund (IMF). At that time, Portugal was adjusting from an adverse combination of domestic and external shocks that moved the economy away from full employment and external balance. This state of affairs included a global recession, high oil prices, a massive return migration from the former Portuguese colonies in Africa, and political and social instability following the military coup. On the policy front, the economy underwent a wave of government interventions, which the authors identified as a movement towards a "politicized market economy", i.e. "one in which the distributional role of prices becomes a justification for their manipulation" (p 456).

The main contribution of the article was the introduction of a visual tool to map the trajectory of a small open economy, which focused on two policy goals, "internal balance" and "external balance" and on two strategic variables - the "real output gap" (defined as the actual relative to potential output) and the "real-wage gap" (defined as the real wage relative to the "warranted level", i.e. the level that would be consistent with internal and external balance). Using this tool, the authors analysed the macroeconomic adjustment of the Portuguese economy for the period 1974-78. The Krugman-Macedo (KM) diagram was revisited by Braga de Macedo (1984, 1990) in the analysis of the economic and political dilemmas associated with Portugal's process of European integration and resulting policy responses. As the author points out, excessive wage growth was no longer the main issue in the subsequent macroeconomic episodes. Instead, the rivalry between the two main trade unions, which eroded their bargaining power, together with the emergence of short-term renewable labour contracts, allowed employers to overcome rigid labour laws and adjust to changing economic circumstances.

Portugal has changed much in the last four decades. Democracy has been consolidated, economic institutions were developed in the context of the European Union (EU), and its productive structure has been modernized. Nevertheless, the recent crises revealed a macroeconomic environment that was highly vulnerable to changes in international borrowing conditions. By 2011, Portuguese authorities requested international financial assistance for the third time since the 1974 Revolution. The previous decade had witnessed the accumulation of large external imbalances fuelled by capital inflows. During that period, real wages had increased faster than the corresponding EU average, fiscal conditions remained fragile, and oil prices had risen. In an influential paper, Blanchard (2007) argued that external competitiveness had been eroded because unit labour costs had increased faster than abroad. Thus, in the absence of an exchange rate tool, the required adjustment in relative prices would doom the country to a long period of disinflation until downward wage and price pressures brought the economy back to external balance. The view that rapid wage growth was the cause of external imbalance (rather than its consequence) is controversial (Campos e Cunha 2008). Still, Blanchard and

Portugal (2017), contended that much of the recovery of the current account along 2011-13 was the result of a negative and large output gap ("import compression"). Reis (2015), on the other hand, emphasized the considerable expansion of exports, "in spite of small changes in relative prices" (p.443).

The purpose of this paper is to revisit the main phases of the Portuguese macroeconomic adjustment using the lens of the KM diagram.[1] We depart from the original work in that our assessment of the real-wage gap is based on an index of relative unit labour costs *vis-à-vis* the EU. Instead of calibrating a production function, we use regression analysis. We find that oil prices continue to play an important role, even though this influence has been declining. Our analysis suggests that the emergence of large current account deficits during the 2000s was indeed associated with a departure of the real exchange rate from its warranted level, and also that much of the external adjustment during 2011-13 was achieved through expenditure reduction, as argued by Blanchard and Portugal (2017). However, the real exchange rate also adjusted downwards - in line with the contraction in demand - pulled by declining nominal wages. Moreover, an improvement in the terms of trade at the outset of the adjustment program implied an increase in the "warranted real wage", driving the real exchange rate gap below zero. The downward adjustment in wages, together with benign external conditions have thus allowed the Portuguese economy to return to external balance under full employment without a long process of "competitiveness through disinflation".

The remainder of this paper is organized as follows: in Section 2, we present the KM diagram. In Section 3, we propose an approach, based on the real exchange rate, to measure the gap between the actual real wage and the one that would be consistent with internal and external balance. In Section 4, we describe our empirical strategy. In Section 5, we present the main empirical results. In Section 6, we revisit the KM diagram to analyse the macroeconomic adjustment of the Portuguese economy since the 1974 Revolution. Section 7 concludes.

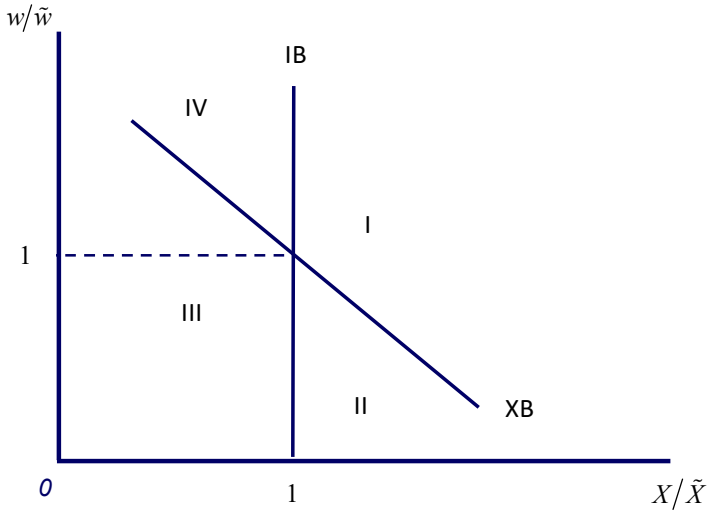
2. The Krugman-Macedo Diagram

In their proposed analytical framework, Krugman and Macedo (1979) focused on two key strategic variables: the real wage rate and the output level. The authors argued that these two variables are critically important among the various determinants of employment and of the balance of payments. A higher level of output is associated with a higher level of employment, *ceteris paribus*. In turn, real wages are a key relative price in a small open economy, as they affect the incentives to consume and produce tradable and non-tradable goods (and hence, the current account).

[1] Blanchard and Portugal (2017) also summarize the recent macroeconomic adjustment of the Portuguese economy in terms of a diagram showing the deviations from "internal balance" and "external balance" but do not disentangle the contribution of relative prices.

Given that economies are constantly being exposed to different types of shocks that affect the levels of both output and real wages consistent with full employment and external balance, the authors focused on the gaps between the actual levels of these two strategic variables and their corresponding reference levels. The diagram's two dimensions, replicated in Figure 1, are therefore the "output-gap" (defined as the actual relative to potential output) and the "real-wage gap" (defined as the actual relative to the "warranted" real wage, i.e. the level consistent with internal and external balance).

Figure 1 – The Krugman-Macedo Diagram



The strategic variables are determined by both policy (government spending, exchange rate, and laws) and exogenous factors (such as productivity). These factors can have an impact either through the actual levels of the variables (actual real output and actual real wages) or through changes in the corresponding reference levels (full employment output or warranted real wage). For example, an increase in oil prices causes the trade balance to deteriorate, thereby requiring a lower real wage to ensure external balance, *ceteris paribus*. If market failures or legal impediments prevent the actual wage from reaching its "warranted" level, then a positive real-wage gap will result.

The strategic variables, in turn, affect the employment level and the balance of payments. The KM diagram thus plots the "output gap" and "real-wage gap" combinations that are consistent with full employment and external balance. Potential output is assumed to depend only on endowments and technology, and not

on real wages.[2] For this reason, the Internal Balance locus (IB) is a vertical line. By construction, observations on the right-hand-side of the vertical axes correspond to situations of macroeconomic overheating, and those of the left-hand-side describe situations of unemployment.

The External Balance locus (XB) is represented by a negative relationship between the real-wage gap and output: *ceteris paribus*, an increase in real wages causes a reallocation of resources towards non-tradable goods and a demand shift towards tradable goods, causing the trade balance to deteriorate. Thus, a decrease in domestic demand is required to restore the external balance.[3] As shown in Figure 1, the IB and XB locus split the diagram into four zones of economic unhappiness: Zone I – "inflation and deficit"; Zone II – "inflation and surplus"; Zone III – "unemployment and surplus"; and, Zone IV – "unemployment and deficit". Internal and external balance occur when $w = \tilde{w}$ and $X = \tilde{X}$.

The advantage of the KM diagram, relative to the conventional Swan diagram (Swan 1956), is that it focuses on strategic rather than "raw" policy variables. This makes it more versatile to describe an economy's adjustment path, especially when different policies and other exogenous factors simultaneously affect the same strategic/intermediate variable.

3. The Real-Wage Gap and the Real Exchange Rate

To map the trajectory of the Portuguese economy in the KM diagram, Krugman and Macedo (1979) made "hypothetical calculations" for the real-wage gap, based on estimates of the actual real wage, productivity, terms of trade effects, indirect taxation and Social Security contributions. In their calculations, the authors assumed a production function with unit elasticity of substitution between capital and labour.

Under the assumption of unit elasticity, departures of the wage rate from the level implied by the labour demand can be computed as the deviation of the labour share in national income from a reference level. Formally, let W denote the average compensation per employee, including taxes and employer contributions (the "nominal wage,") and let a denote the gross-value-added at constant prices per worker (the "average product of labour"). Letting β denote the elasticity of output with respect to the labour input, profit maximization under perfect competition implies that the real warranted wage rate must obey to:

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[2] For the sake of simplicity, the model ignores the labour-supply response to changes in real wages.

[3] Note that the external balance does not refer to a country's state of intertemporal solvency. It refers instead to the non-accumulation of liabilities *vis-à-vis* the rest of the world. This is not necessarily a policy goal, at each moment in time, but rather a reference point for what should happen (on average) for a country to remain solvent.

$$\frac{\tilde{W}}{P} = \beta a \tag{1}$$

Given the actual nominal wage, *W*, the real-wage gap is then as follows:

$$\frac{W}{\tilde{W}} = \frac{ULC}{\beta P} \tag{2}$$

where $ULC = W/a$. In light of Eq (2), the wage gap is zero whenever the share of labour in national income equals β . Krugman and Macedo (1979) assumed the labour-share benchmark to be equal to one half.

Estimating the real-wage gap using Eq (2) corresponds to assessing the extent to which real wages deviate from the level implied by the demand for labour. This method, however, abstracts from wage developments abroad, and is therefore an imperfect measure to capture the external balance. In this paper, we focus instead on unit labour costs at home versus those abroad (the real exchange rate based on unit labour costs):

$$\theta = \frac{ULC}{ULC^*} = \frac{W/a}{W^*/a^*} \tag{3}$$

Letting $\tilde{\theta}$ denote the real exchange that is consistent with internal and external balance, the "warranted" nominal wage rate is thus given by $\tilde{W} = a\tilde{\theta}ULC^*$. Our measure of "wage gap" is essentially a measure of the real exchange rate gap:

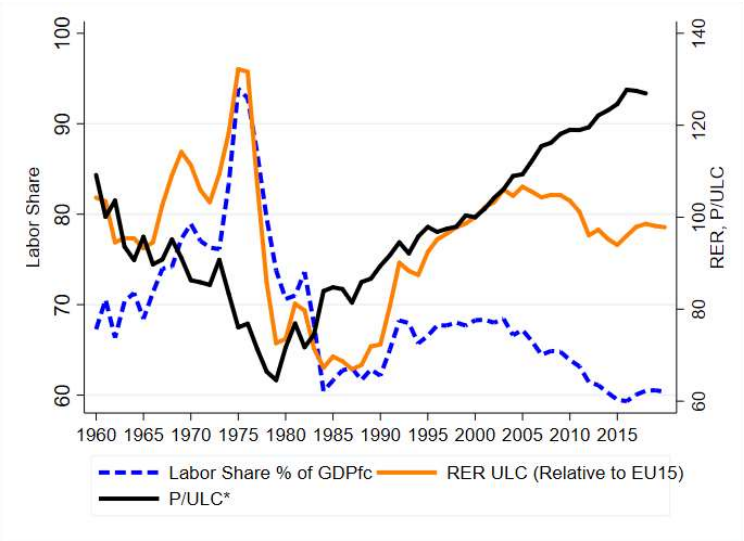
$$\frac{W}{\tilde{W}} = \frac{ULC}{\tilde{\theta}ULC^*} = \frac{\theta}{\tilde{\theta}} \tag{4}$$

In light of Eq (4), the wage gap is zero when the actual real exchange rate, θ , is equal to the warranted real exchange rate, $\tilde{\theta}$.

Abstracting for a moment from the value of $\tilde{\theta}$, we compare, in Figure 2, the time paths of Portugal's actual labour share ULC/P and real exchange rate (θ) for the period 1960-2018 (for the data, see Tables 2 and 3). The difference between the two curves is accounted for by the ratio P/ULC^* , which is depicted as a dashed line. As shown in the figure, the labour share and real exchange rate moved roughly together from the beginning of the sample until the early 1990s (the 10-year correlation between the two series reaches 93% in 1995). Between the mid-1990s and 2007, however, the real exchange rate is increasing while the labour share remains roughly constant (the 10-year correlation declines to -0.40%). This observation suggests that the real-exchange-rate appreciation during this period had more to do with changes in the relative prices between tradable and non-tradable

goods caused by imbalances between savings and investment, than with wage-productivity misalignments (Lebre de Freitas and Faria e Castro 2014). This observation motivates our focus on measure (4).

Figure 2 – Unit Labour Costs, Real Exchange Rate and Labour Share (1960-2017)



Source: Authors' calculations using AMECO data.

4. Empirical Approach

The main methodological challenge is to find the notional warranted real exchange rate (henceforth WRER), against which the actual real exchange rate (RER) can be compared. This WRER must be time-varying, since the economy is constantly exposed to real shocks. In this paper, we use regression analysis to estimate the real exchange rate that would be consistent with full employment and external balance at each moment in time. We adopt the notion of external balance proposed by Williamson (1983): a situation in which the "fundamental account" (defined as the sum of the economy's primary current account deficit with net inflows of foreign direct investment) is equal to zero.

The WRER may, in principle, be influenced by a number of factors that include productivity in the tradable and non-tradable sectors, the composition of government spending, terms of trade, net international investment position, unilateral transfers, among others (Rebelo and Vegh 1995). Let $\mathbf{Y}_t$ be the vector of

long-run determinants of the WRER, including a constant. Then, a log-linear model of real exchange rate determination can be written as:[4]

$$\theta_t = \boldsymbol{\beta Y_t} + \gamma FA_t + u_t \ . \tag{5}$$

In the short-run, deviations of the real exchange rate from the WRER are associated with departures of the fundamental account balance from zero (its long-run value). Denoting by x_t and $\tilde{x}_t$ actual and potential output, respectively, we can describe the behaviour of short-term fluctuations in the fundamental account as:

$$FA_t = \alpha_0 + a_1(x_t - \tilde{x}_t) + a_2\left(\theta_t - \tilde{\theta}_t\right) + v_t \tag{6}$$

Our baseline approach consists of first estimating Eq (5) and then using the resulting estimates together with $FA_t = 0$ to obtain a measure of the WRER ($\tilde{\theta}_t = \widehat{\boldsymbol{\beta}}\boldsymbol{Y_t}$). Then, we use this measure to estimate Eq (6).
As robustness, we consider a one-step approach that consists of replacing Eq (5) in Eq (6) and estimating these relationships in a single step:

$$FA_t = \alpha_0 + a_1(x_t - \tilde{x}_t) + a_2\theta_t - \boldsymbol{\delta Y_t} + \varepsilon_t \tag{7}$$

where $\varepsilon_t = \nu_t - a_2 u_t$, and $\boldsymbol{\delta} = a_2\boldsymbol{\beta}$. In the one-step procedure, the WRER is computed by first estimating Eq (7) and then imposing both external balance ($FA_t = 0$) and internal balance ($x_t = \tilde{x}_t$), that is $\tilde{\theta}_t = \left(-\hat{\alpha}_0 - \widehat{\boldsymbol{\delta}}\boldsymbol{Y_t}\right)/\hat{\alpha}_2$. This one-step approach is reminiscent of Dolado and Vinals (1991).[5]

5. Estimation

Our baseline two-step specification consists of first estimating Eq (5) and then using the resulting WRER estimates to estimate Eq (6), where we include an autoregressive term to account for potential serial correlation. We do not include any lags of independent variables in order to allow for reverse causality. We experiment with different combinations of variables in the $\mathbf{Y}_t$ vector, guided by the literature: (i) measures of the foreign output gap, (ii) the ratio of government spending to GDP, (iii) a measure of terms of trade, (iv) a measure of relative total factor productivity, *vis-à-vis* the rest of the world; and (vi) the real price of oil.[6]

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[4] This approach is adapted from Clark and MacDonald (1998).

[5] Studies using the Dolado and Vinals (1991) approach focusing on the Portuguese economy include Lebre de Freitas (1992), Costa (1998), Lebre de Freitas and Faria e Castro (2014). Over the overlapping periods, the corresponding gap estimates are broadly consistent with our own.

[6] For details on the sources and construction of all data series, see Appendix A.

After some experimentation, our preferred specification is one where the real oil price and its interaction with a linear trend appear as determinants of the WRER. The linear trend accounts for structural changes in the importance of oil for the Portuguese economy, which has declined over time.[7] In what follows, we also present results where we use a terms of trade series taken directly from AMECO. All of our results are robust to including this alternative measure.

Table 1 - Estimation Results: two-step and one-step

	(1) 1st Stage: $\log \theta_t$	(2) 2nd Stage: FA_t	(3) Single-Step: FA_t
Constant	4.645***	-0.00102	0.810***
	(142.68)	(-0.27)	(4.84)
FA_t	-1.797***		
	(-4.82)		
ToT_t	-0.210***		-0.0450***
	(-5.39)		(-3.31)
$\text{ToT}_t \times t$	0.00327***		0.000768**
	(3.60)		(2.61)
FA_{t-1}		0.683***	
		(7.22)	
$\log \theta_t - \log \tilde{\theta}_t$		-0.0789**	
		(-2.67)	
$x_t - \tilde{x}_t$		-0.240**	-0.287*
		(-2.15)	(-1.72)
$\log \theta_t$			-0.174***
			(-4.84)
N	54	53	54
adj. R^2	0.457	0.663	0.321

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1 presents the two stage results in columns (1) and (2), respectively. Column (3) shows the single-step specification results from Eq (7). All coefficients are significant at the 5% level in both stages. Furthermore, all coefficient signs are consistent with the relationships predicted by theory. In the first stage, the real exchange rate depreciates with an increase in the real oil price or with an increase in the fundamental account balance. In the second stage, the fundamental account balance deteriorates with either an increase in the domestic output gap or with an

[7] As shown in Table 3, the energy deficit at constant prices, which can be interpreted as an indicator of oil dependence, has been decreasing over time.

increase in the real exchange rate gap. These relationships are preserved in the single-step specification. The data for the fundamental account balance, along with the fitted values from the one and two-step procedures, are plotted in Figure 3.

Figure 3 - Fundamental Account Balance: Actual and Fitted, 1960-2017

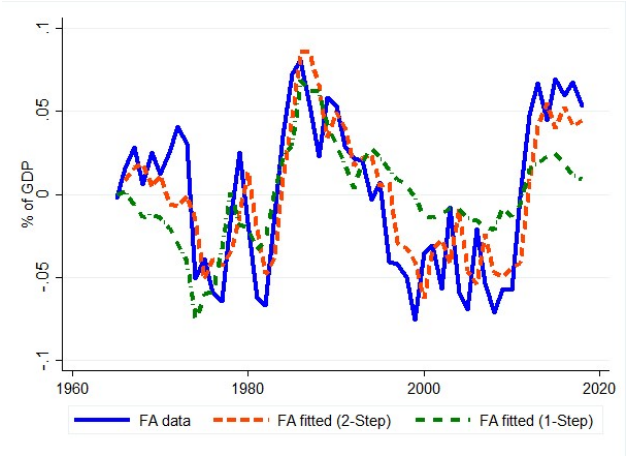


Figure 4 - Real Exchange Rate and Estimated WRER (logs), 1960-2017

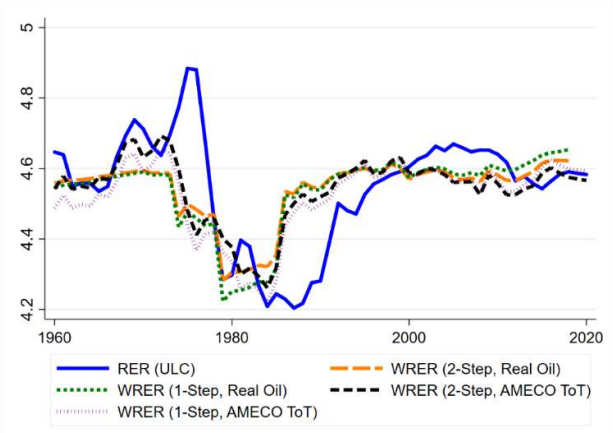


Figure 4 plots the real exchange rate path, together with alternative WRER estimates (using either the two- or one-step procedures, or the AMECO terms of trade series). The corresponding measures of real exchange rate gap are shown in Figure 5. The paths for the WRER and for the corresponding gap estimates are similar across specifications.

Figure 5 - Exchange Rate Gap estimates, 1960-2017

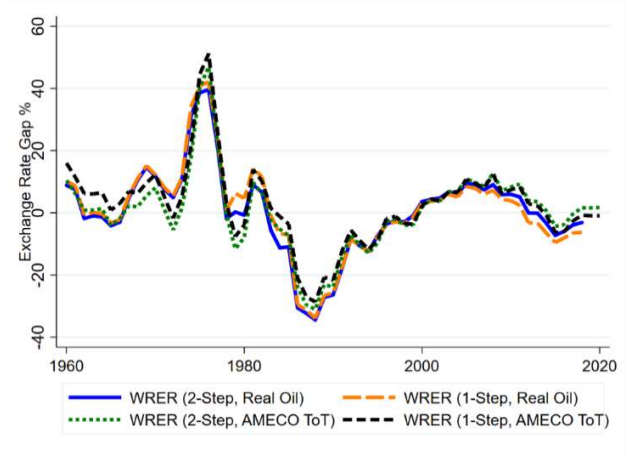
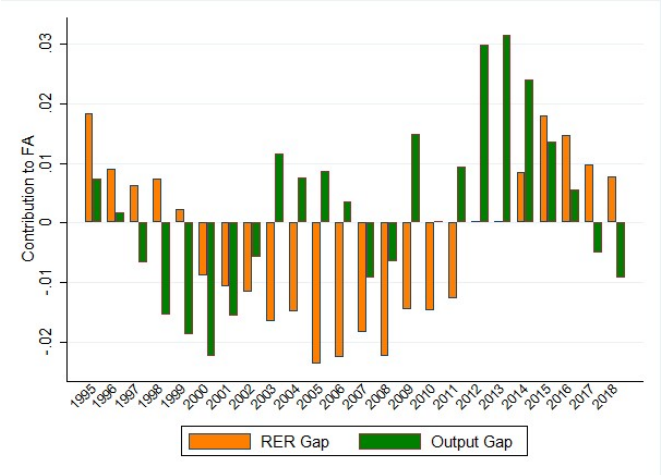


Figure 6- Fundamental Account Decomposition (1995-2018)



Notes: The figure shows the long-run contributions of the output and real exchange rate gaps to movements in the fundamental account, based on equation (6) and the estimates of column (2) in Table 1.

The estimated path for the equilibrium real exchange rate indicates significant departures from the period average, reflecting large swings in oil prices throughout the 1970s and early 1980s, and again in the 2000s. In this latter episode, however,

the impact on the WRER was lower, due to the fundamental balance being less sensitive to changes in oil prices.

Figure 6 identifies the relative contributions of the output and real exchange rate gaps to the movements in the fundamental account, using the second stage of our two-step procedure (column 2 in Table 1). These relative contributions are plotted starting in 1995. The decomposition highlights the fact that most of the fundamental account deficit until the recent adjustment program can be accounted for by a positive real exchange rate gap. The contribution of the RER gap falls in recent years, completely disappearing by 2012. By 2014, the RER has depreciated sufficiently so that the RER gap contributes positively to the fundamental account balance.

6. Five decades of macroeconomic adjustment through the lens of the Krugman-Macedo diagram

We now use the estimated results to revisit the KM diagram. In Figure 7, we depict the path of the Portuguese economy from 1971 to 1995. In Figure 8, we continue until 2017. As in Figure 1, the horizontal axes measure the output gap, while the vertical axes measure the real exchange rate gap. The negatively sloped line corresponds to the combinations of output of real exchange rate gaps that are consistent with full employment, using the estimates taken from column (2) in Table 1. Data on fundamental account, output gaps, real exchange rate, estimated WRER, and real exchange rate gap are displayed in tables 2 and 3.

Needless to say, the empirical exercise involves a number of limitations. First, the second stage of our two-step procedure is estimated using a dependent variable lag, which slightly complicates the mapping between the estimated coefficients and the external balance locus. Second, the output and real exchange rate gaps only explain around 66% of the variation in the fundamental account balance, based on our estimates. Nonetheless, our simple KM diagram calibration appears to deliver sensible results.

6.1. Stop and Go (1973-1985)

In the early seventies, unit labour costs were apparently already above equilibrium. At that time, Portugal was engaged in a rapid economic export-led expansion and the labour market was tightening, in part due to high emigration and the ongoing Colonial War. Both Krugman and Macedo (1979) and Braga de Macedo (1984 & 1990) place the economy in 1973 close to the origin. Current data indicates however a positive output gap, and our estimates suggest that the economy would have been located in zone I (external deficit and inflation). In practice, large emigrant remittances, a positive income balance, and net FDI inflows allowed the fundamental balance to remain positive, in spite of increasing trade deficits.

In line with Krugman and Macedo (1979), we identify a significant impact of the first oil shock in the warranted real wage rate. According to our calculations, relative unit labour costs should have declined cumulatively by 9.7% between 1973 and

1976. [8] However, both government actions (such as wage setting, price controls) and inactions (passive fixed exchange rate policy) helped the actual real exchange rate to move in the opposite direction, at odds with the economy's fundamentals. Between 1974 and 1975, the real exchange rate appreciated 21%, and in the face of a deep recession, the economy entered in Zone IV, of unemployment and external deficit (figure 7).

In 1975, imports declined by 22% largely as a result of the fall in investment, which helped contain the current account deficit. After the 1976 elections, however, the first Constitutional Government attempted to expand the economy by stimulating aggregate demand. Although measures were deployed to mitigate the loss of competitiveness (such as limits to nominal wage expansion, the introduction of temporary labour contracts, and nominal exchange rate depreciation), these proved to be insufficient and the current account deficit reached a record high of 7.8% of GDP by year end. It was only after the exchange rate regime was changed, with the introduction of a crawling peg in August 1977, that competitiveness started to recover. During 1977-79, the real exchange rate depreciated by as much as 45% and the wage gap was virtually closed by the end of 1979, in spite of the second oil shock. Thanks to a significant surge in exports in the face of a favourable external environment, and also the recovery of emigrant remittances spurred on by renewed confidence, the Portuguese economy managed to approach the internal balance locus even as it implemented the IMF stand-by stabilization program (April 1978 - March 1979).

During 1980-82, terms of trade remained stable. However, the sixth Constitutional Government shifted the policy focus away from external balance and towards disinflation and assigned the exchange rate an anti-inflation role. Although the crawling peg was maintained, the escudo was revalued by 6% in 1980. Throughout 1980-82, real exchange rate appreciation was small compared to the previous phase but it occurred in a more unfavourable external environment, which was marked by a world recession, high international interest rates, and an appreciating dollar.[9] On the other hand, the general government deficit had deteriorated significantly, reaching a record high in 1981. In 1982, the trade balance deficit reached 17.3% of GDP and following the Latin American debt crisis, Portugal turned to the IMF for a second time after the 1974 Revolution.

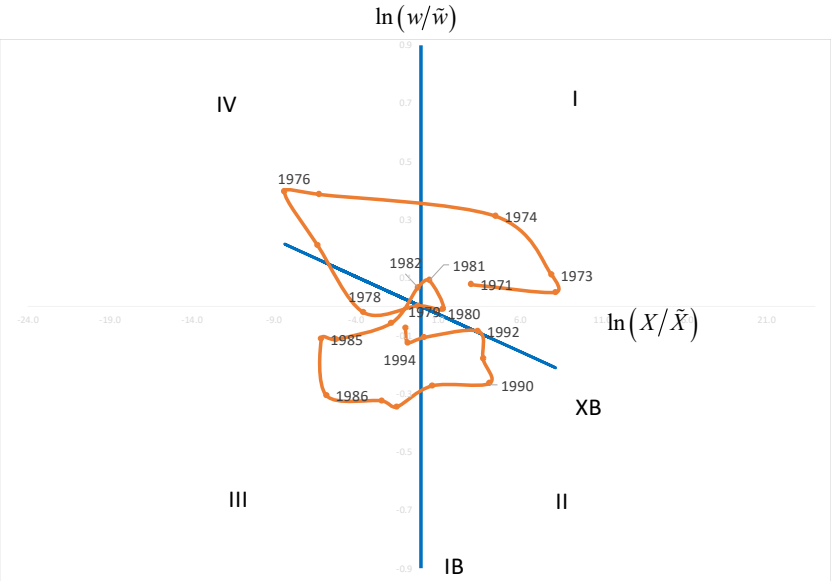
The 1983-84 stabilization plan was implemented by the ninth Constitutional Government in a context of decelerating export markets. However, the adjustment of expectations had withered the crawling peg's ability to change relative prices (a phenomenon that Braga de Macedo (1985) labelled "erosion of the crawling peg"). This was particularly evident in 1983-84 when the policy attempt to move the RER gap into negative territory came at the cost of rising inflation. In addition, government deficits increased above 6% of GDP in 1984 and 1985. Unsurprisingly, the 1983-85 adjustment relied much more on expenditure reduction through tight

[8] Unless otherwise stated, we refer to the numbers reported in Tables 2 and 3.

[9] As pointed out by Braga de Macedo (1985), the real exchange rate based on unit labour costs underestimates the loss in competitiveness in this period because it ignores the cost of capital, which was increasing due to tight credit constraints.

monetary policy rather than on expenditure switching, in a marked contrast with the previous stabilization plan.[10] In 1985, a political crisis delayed the recovery and the Portuguese economy moved deep into zone III, with the unemployment rate reaching a record level of 9.8% and the fundamental balance account registering a surplus.

Figure 7 - The Krugman-Macedo Diagram (1971-1995)



6.2. Liberalization and disinflation (1986-1992)

In 1986, the tenth Constitutional Government took over a recovering economy under quite favourable external conditions. First, the world economy was expanding. Second, as a new member of the then European Economic Community, Portugal became entitled to a net inflow of official transfers, which averaged 1.3% of GDP between 1986 and 1992. Third, Portugal faced a surge in net FDI, which peaked at 4% of GDP in 1990. Fourth, and most importantly, oil prices fell sharply and remained low for almost two decades. This meant that external finance constraints were significantly relaxed. According to our estimates, the warranted real exchange rate appreciated by 19.9% between 1985 and 1986. As shown in Figure 8, along 1986-89, the economy expanded with a negative wage gap,

[10] For reviews of this period, see Pinto (1983), Macedo (2008), and Amaral (2019).

approaching zone II, of inflation and external surplus (the same path is identified in Braga de Macedo, 1990).

In terms of structural reforms, the tenth Constitutional Government's commitment to fighting inflation (which was 19.5% in 1985) and to the progressive elimination of capital controls challenged the policy practice that had prevailed thus far. This policy had relied on the use of credit ceilings as the main tool of monetary policy, and both seigniorage and financial repression as sources of government finance (Braga de Macedo and Sebastião 1989; Beleza and Braga de Macedo 1988). The required reforms thus entailed a change in the monetary policy framework, and fiscal reform to ensure the sustainability of government debt in a context of financial liberalization.

In the short-run, openness to capital flows was likely to cause a real exchange rate appreciation, unless fiscal policy acted in a strongly countercyclical manner (Krugman 1990). Since that was not the case, money supply expanded above target causing inflation to surge again in 1988. The central bank responded with higher reserve requirements, barriers to capital inflows and a movement towards exchange rate-based stabilization. From 1988 onwards, the rate of crawl became non-accommodating, and, in October 1990, the crawling peg was itself replaced by a managed float, whereby the exchange rate was allowed to appreciate in an unpredictable manner. Meanwhile, nominal wages were growing at a two-digit pace, reflecting a fall in the unemployment rate to below its natural level.[11] From 1988 until 1992, the real exchange rate appreciated 33%, and the economy approached external balance with a positive output gap (Figure 7).

In 1992, six months after Jorge Braga de Macedo was appointed Minister of Finance of the twelfth Constitutional Government, the Escudo joined the Exchange Rate Mechanism (ERM) of the European Monetary System (EMS), and became fully convertible by year end, completing a regime change that Braga de Macedo (2001) argued to have started with the 1989 Constitutional Amendments. From 1992 to 1995, the Portuguese Escudo's central parity was adjusted three times (6% in November 1992, 6.5% in May 1993, and 3.5% in March 1995) due to speculative attacks on the ERM. Meanwhile, wage growth decelerated, reflecting both adaptation to a low inflation environment, and also the emergence of a negative output gap after the 1993 recession. Until 1995, the real exchange rate remained close to its warranted level and the economy approached both internal and external balance (the origin in Figure 7).

[11] See Abreu (2001) for a discussion of Portugal's disinflation experience during 1984-98.

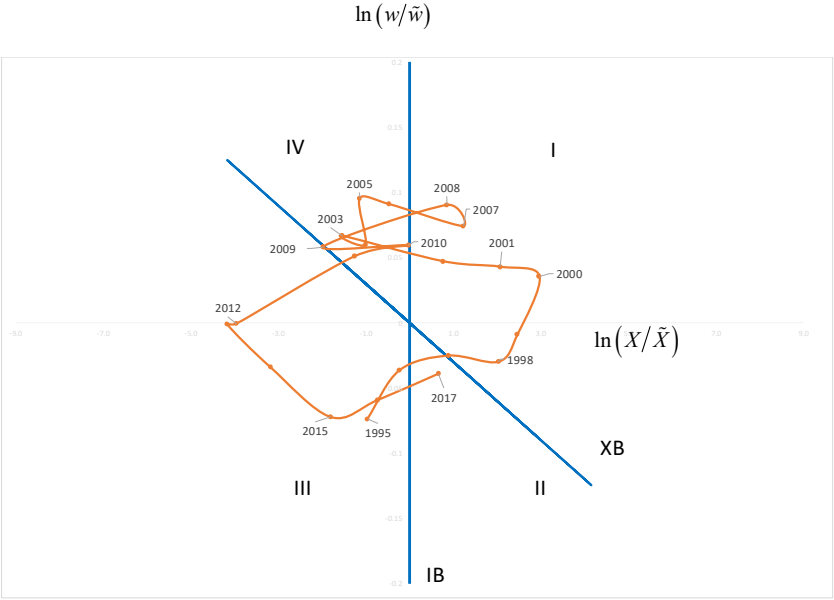
Table 2 – Main Macroeconomic Indicators (1973-1995)

	Source	Unit	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Real GDP growth	EC	% ch	4.9	2.9	-5.1	2.3	6.0	6.2	7.1	4.8	2.2	2.2	1.0	-1.0	1.6	3.3	7.6	5.3	6.6	7.9	3.4	3.1	-0.7	1.5	2.3
TFP Growth	EC	% ch	2.8	0.7	-5.9	1.0	3.8	5.7	3.7	3.3	-0.6	1.4	0.0	-1.4	0.5	4.0	4.6	2.1	3.6	4.9	-0.2	2.3	-0.8	0.9	1.7
Output Gap (Potencial)	EC	%	7.9	4.5	-6.3	-8.4	-6.4	-3.6	-0.3	1.3	0.4	-0.3	-1.9	-5.3	-6.2	-5.9	-2.5	-1.5	0.7	4.2	3.8	3.5	0.2	-0.8	-1.0
Output Gap (EU15)	EC	%	3.2	1.8	-1.9	-0.4	-0.3	0.3	1.5	0.5	-1.1	-1.9	-2.1	-1.6	-1.3	-1.1	-0.7	0.8	1.7	2.0	1.3	0.1	-2.1	-1.5	-1.1
Unemployment rate (total)	EC	%	2.6	1.7	4.4	6.2	7.4	8.1	8.2	8.0	7.8	7.8	8.9	9.6	9.8	9.5	8.0	6.7	6.0	5.6	5.0	5.0	6.3	7.6	7.9
Empl: manuf./(services+constr.)	EC	Ratio					0.53	0.54	0.53	0.53	0.52	0.51	0.50	0.49	0.49	0.48	0.48	0.47	0.46	0.44	0.42	0.39	0.38	0.38	0.36
CPI inflation	EC	% change	13.0	26.2	17.3	19.9	26.7	20.9	21.7	16.1	19.2	21.5	24.0	28.5	19.5	12.3	9.6	10.1	12.7	13.6	11.8	9.6	6.8	5.4	4.2
Nominal compensation p/employee	EC	% ch	18.2	31.7	31.6	18.1	19.3	16.9	15.7	25.3	21.3	23.3	19.0	15.2	22.4	21.2	15.7	13.2	18.4	17.2	16.7	18.7	7.3	5.3	10.3
ULC (total economy)	EC	% ch	12.2	27.1	37.1	15.0	12.9	8.4	10.4	19.1	20.0	18.4	16.5	14.7	20.4	14.1	10.0	9.8	13.1	10.5	16.0	13.3	5.8	2.7	7.0
Labour share	EC	% GDP	76.1	83.3	93.8	92.8	86.7	79.5	73.8	70.6	71.0	73.6	67.8	60.4	61.6	62.7	63.0	61.6	62.8	62.1	65.0	68.2	67.9	65.7	66.5
Nominal exchange rate (EUR)	EC	% ch	-0.7	-1.1	5.0	6.9	29.7	28.1	20.0	3.8	-1.5	13.9	26.5	17.2	12.6	12.9	10.6	4.6	2.0	4.4	-1.4	-2.2	7.8	4.5	-0.4
ULC (relative to EU15)	EC	1995=100	109.4	118.4	132.2	131.6	107.3	85.8	72.6	73.5	81.2	79.7	71.5	67.3	69.7	68.7	67.0	67.9	71.9	72.3	80.7	90.1	88.3	87.4	92.4
WRER ULC			98.1	86.8	89.9	88.5	86.9	87.4	72.4	74.1	74.2	74.6	75.6	75.3	77.8	93.2	92.5	95.7	94.4	94.1	96.6	98.0	98.2	99.0	99.5
RER Gap		%	11.5	36.4	47.1	48.7	23.5	-1.8	0.3	-0.7	9.4	6.8	-5.5	-10.6	-10.4	-26.3	-27.6	-29.1	-23.8	-23.2	-16.5	-8.1	-10.1	-11.6	-7.1
Exports of goods and services	EC	% ch	12.5	-5.0	-14.4	-0.2	5.2	10.1	27.8	11.1	-0.6	4.8	20.8	14.3	8.3	8.0	10.1	8.6	18.7	13.0	0.5	5.4	1.3	10.5	13.6
Imports of goods and services	EC	% ch	12.6	7.2	-22.4	6.6	13.0	0.6	8.5	19.9	6.6	5.9	-6.5	-2.1	4.6	18.8	27.4	21.6	8.5	16.1	8.4	11.0	-1.5	10.6	9.4
Current account	BP	%GDP	1.9	-6.0	-5.3	-7.8	-8.4	-4.0	0.1	-4.7	-10.8	-12.9	-7.2	-3.7	0.5	3.5	1.5	-1.8	1.0	0.5	-0.9	-0.3	0.0	-2.3	-3.4
Capital Account	BP	%GDP														0.5	0.7	1.1	1.2	1.4	1.9	2.1	2.4	2.0	2.5
FDI (net)	BP	%GDP	0.7	0.6	0.6	0.3	0.3	0.3	0.3	0.6	0.6	0.6	0.6	1.0	1.2	0.8	1.2	2.0	3.4	4.1	3.2	2.3	1.8	1.4	0.7
Fundamental Balance		% GDP	3.0	-5.1	-3.9	-5.9	-6.4	-1.7	2.5	-1.7	-6.2	-6.7	-1.1	3.5	7.3	8.1	5.3	2.2	5.8	5.3	2.9	2.1	2.0	-0.3	0.7
Energy deficit	M.Econ.	%GDP																		2.7	2.2	1.8	1.6	1.5	1.6
Brent oil Price	EIA	USD	3.3	11.6	11.5	12.8	13.9	14.0	31.6	36.8	35.9	33.0	29.6	28.8	27.6	14.4	18.4	14.9	18.2	23.7	20.0	19.3	17.0	15.8	17.0
Real oil price (GDP defl.)		1990s=1	0.6	1.9	1.6	1.8	2.0	2.0	4.2	4.0	4.1	4.1	4.1	4.2	3.9	1.5	1.7	1.2	1.5	1.5	1.2	1.0	1.0	0.9	0.8
Energy deficit (constant prices)		1990s=1																		1.7	1.8	1.8	1.6	1.7	2.0
Terms of trade effect		%GDP																		0.9	0.4	0.0	0.0	-0.2	-0.4
Households savings	BP/EC	%GDP	23.6	19.7	25.4	24.3	16.4	19.2	20.0	18.8	20.8	24.2	22.1	20.1	21.2	19.0	20.0	13.6	16.2	16.2	15.2	14.7	13.8	10.6	10.8
Corporate savings	BP/EC	% GDP	7.4	5.6	-2.0	-0.4	10.8	12.4	14.5	16.1	13.0	3.6	5.2	10.3	12.0	11.8	13.7	15.3	12.9	15.5	12.3	8.8	9.7	13.0	11.2
Government savings	BP/EC	% GDP	3.9	1.5	-0.5	-1.4	-0.2	-2.0	-1.2	-3.5	-6.8	-2.6	-1.8	-6.2	-6.1	-1.8	-2.1	0.5	1.3	-1.4	-2.6	0.8	-2.1	-2.9	-1.2
Gross Fixed Capital Formation	BP/EC	% GDP	33.0	32.9	28.3	30.4	35.4	33.6	33.2	36.0	37.9	38.0	32.6	27.8	26.6	25.9	30.5	32.2	30.5	31.1	27.5	27.4	24.1	25.0	24.2
Of which: dewllings	EC	%GDP	13.6	14.8	11.1	9.7	13.2	10.6	17.4	9.4	12.0	10.9	11.7	12.5	12.1	9.2	9.0	10.7	10.3	9.0	7.7	8.7	7.0	7.1	7.3
Gen. government gross debt	EC	% GDP	13.4	13.3	18.9	24.1	26.5	29.4	33.0	29.1	36.8	40.3	43.8	48.0	55.7	56.0	53.6	53.2	51.9	52.5	54.8	49.3	53.8	56.5	58.3
Government bond yields	EC	%													27.7	15.8	15.1	14.2	14.9	15.4	14.5	13.8	9.7	10.5	11.5

6.3. The Path to the Euro (1992-2000)

Upon the establishment of the Single Market in 1992, Portugal's main policy goal became eligibility for European Monetary Union (EMU) participation. It was left up to the thirteenth Constitutional Government to establish exchange rate stability, price stability and fiscal sustainability. Between 1995 and 2000, the economy entered a positive cycle with fast GDP growth (3.8% on average), in a context of easing monetary conditions, marked by free capital movements and policy subordination to the exchange rate. Market perceptions that Portugal would be able to join the EMU as a founding member paved the way to a capital flow bonanza, and government bond yields declined. Bank credit to the private sector expanded rapidly, fuelled by capital inflows. Private savings fell and investment surged, both fed by expectations of faster productivity growth (Blanchard and Giavazzi 2002). Private sector debt increased from 81.5% of GDP in 1995 to 124.5% in 1999.

Figure 8 - The Krugman-Macedo Diagram (1995-2017)



The imbalance between national savings and investment, matched by capital inflows, called for the increase in the relative price of non-tradable goods. During this period, the real exchange rate based on unit labour costs departed from the labour share (Figure 1). While real wages were basically evolving in line with the average product of labour, the increase in non-tradable good prices made nominal unit labour costs expand faster than abroad (Lebre de Freitas and Faria e Castro

2014). When Portugal joined the EMU, the economy was already in zone I, of inflation and external deficit (Figure 8). Blanchard and Giavazzi (2002) contended that signs of real exchange rate overvaluation were still weak at that time. Our empirical analysis supports this assessment: during 1997-99, most of the fundamental balance deterioration is accounted for by the output gap instead of the real exchange rate gap (Figure 6), which was almost zero in 1999. This state of affairs was no longer true after 2000, however: the continuous increase in the relative price of non-tradable goods and the terms of trade deterioration resulted in a positive real exchange rate gap, which reached a peak of 10% in 2005.

To be sure, a tighter fiscal policy could have mitigated the pressure on the market for loanable funds and banks' appetite for external borrowing. Unfortunately, this policy never materialized. During 1995-99, the reductions in both the government deficit (from 5.2% to 3.0% of GDP) and government debt (from 58.3% to 51% of GDP) were largely accounted for by the cyclical component as well as a favourable snowball effect, while the cyclically adjusted primary budget moved from a surplus to a deficit (Table 3). It came therefore as no surprise that Portugal failed its commitment to ensure fiscal consolidation after the 2000 downturn: in July 2002, the fifteenth Constitutional Government disclosed that the 2001' general deficit had amounted to 4.1% of GDP, exceeding the reference value, triggering the Excessive Deficit Procedure (EDP). In the words of Braga de Macedo (2019), Portugal was still having a "serious budgetary problem that the change in regime had been unable to solve" (p. 40).

6.4. The Slump and the global crisis (2001-2010)

The 2001 downturn initiated a period of low economic growth, which coincided with rising oil prices (from 18 USD/barrel in 1999 to 97.2 in 2008).[12] The warranted real exchange rate was negatively impacted, even though the Portuguese economy was then less energy-dependent than it had been in the 1970s. Since the actual real exchange rate was still increasing, a positive wage gap emerged.[13] As the growth outlook deteriorated, however, investment and consumption declined, reducing the demand for imports. In 2003, the economy moved towards zone IV, of deficit and unemployment, approaching external balance (Figure 8).

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[12] A simple arithmetic exercise using counterfactual oil prices equal to the average in the 1990s points to a direct negative impact on the trade balance, ranging from 1.2 per cent of GDP in 2000 to 2.9 per cent of GDP in 2008 (Table 3).

[13] Additionally, China's admission to the World Trade Organization in 2001 as well as the 2004 EU's enlargement led to an increase in competition both in Portugal's traditional export markets and in terms of attracting FDI. Amador and Caldeira Cabral (2014) argue that the exporting sector had already recovered from these shocks by 2005. Reis (2013) is sceptical of these factors as explanations for the slump.

As a member of the EMU, Portugal benefited from an aura of safety among investors, which allowed foreign capital to keep flowing in and so sustain aggregate demand in spite of rising unemployment and government debt.[14] In a small open economy, capital inflows influence the allocation of resources by altering the relative price of non-tradable goods. Between 1995 and 2010, manufacturing employment declined 27.6%, and employment in services increased by 30%. According to Reis (2013), this reallocation of resources took place in an environment plagued by inappropriate incentives that prevented resources from being invested in the most socially productive uses. With government support and under credit market frictions, resources were invested in low productivity non-tradable industries and in non-priority infrastructure.

During 2004-07, the European economy entered a new expansionary cycle. Portugal, however, was falling behind, hindered by fiscal fragility[15], low productivity and anesthetic capital inflows. Real GDP grew modestly, private investment declined, and the unemployment rate kept rising. The slowdown of potential GDP helped however close the output gap. In a context of increasing unemployment, real wages grew by less than productivity (Duarte et al, 2019), causing a decline in the labour share that would continue throughout the bailout period. Wage moderation helped stabilize the real exchange rate, though above the warranted level. Between 2005 and 2007 the real exchange rate gap declined slightly, but in 2008 a new surge in oil prices pushed the warranted real wage further down. By 2008, the real exchange rate gap was of a magnitude similar to that observed in 1981 (9.5% and 9.4%, respectively).

At the time of the global financial crisis, the Portuguese economy was facing a 12.2% current account deficit, a real exchange rate well above its warranted level and a slightly positive output gap. This situation contrasted with the high deficit period around 2000, where the income effect is likely to have dominated (Figures 6 and 8).

The subprime crisis did not have a significant direct impact on Portugal's financial system. However, the collapse of world trade in 2009 led to a significant

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[14] Lebre de Freitas et al. (2017) provide evidence that EMU membership helped mitigate investors' risk perceptions regarding fiscal unsustainability during the bonanza episodes that affected the EU periphery prior to 2007. Eichenbaum et al. (2016) argue that the IMF's surveillance of Portugal neglected the possibility of a sudden stop.

[15] The EU peer pressure was relaxed following the temporary suspension of the Stability and Growth Pack (SGP) by the Economic and Financial Affairs Council. Despite the government' reliance on sizeable one-off measures to keep the deficit below its reference value (1.4% of GDP in 2002, 2.5% in 2003 and 2.3% in 2004), the European Council considered that Portugal had complied with the Treaty and the corrective procedures were ended in May 2004. In June 2005, however, the seventeenth Constitutional Government) updated the deficit projections for 2005 and 2006. As a result, Portugal was again placed under the EDP in July (European Commission 2005).

hit to the Portuguese economy with exports declining by 10% and GDP contracting 3.1%. In Figure 8, the year of 2009 should be seen as an outlier, since the source of GDP contraction was a decrease in external demand that caused the fundamental balance to deteriorate in the first place. During 2009-2010, an unprecedented fiscal stimulus delivered a temporary output expansion, driving the Portuguese economy close to internal balance but aggravated the external deficit (Figure 8). At the same time, the fiscal deficit reached 11.4% of GDP in 2010, and a negative slowball effect impacted heavily on debt dynamics. As international investors' appetite for risk decreased, Portugal was caught in the turmoil of the European debt crisis. After a series of rating downgrades and yield hikes, Portugal was shut out of global financial markets. In May 2011, the eighteenth Constitutional Government asked the IMF and the EU for financial assistance.

6.5. The bailout and beyond (2011-2017)

In contrast with the two previous IMF arrangements, the 2011-14 bailout package was not primarily intended to address the external imbalance. The program's first goal was to achieve fiscal sustainability and the sovereign's return to external funding markets. However, the program combined an ambitious agenda of structural reforms – some of them long-overdue – with measures to promote banking sector deleveraging and wage competitiveness. External adjustment would be a natural consequence of the narrow financial envelope, banking sector deleveraging and increased competitiveness.

The resulting economic downturn was much larger than anticipated. The program's implementation, under the then recently elected nineteenth Constitutional Government, occurred in a context of contracting export markets, limited access to international borrowing, legal setbacks and poor political communication.[16] Notwithstanding, Portugal had to pursue a markedly procyclical fiscal adjustment in order to regain access to international financial markets. From 2010 to 2013, the cyclically adjusted government primary balance improved by 10.4 p.p. of GDP. Along this period, GDP contracted cumulatively by 6.7% and the unemployment rate jumped from 12% to 16.4% - quite a painful adjustment after years of fiscal profligacy.

Between 2010 and 2012, the economy moved from zone IV in Figure 8 to zone III, of unemployment and external surplus. As suggested by figure 6, "import compression" played a significant role in the external adjustment (imports contracted a total of 12.5% in two years). Notwithstanding, average earnings per worker fell 4.9% in nominal terms, and the real exchange rate depreciated 7.3%, reaching the lowest level since 1996. In a context of deep domestic recession and low external demand, exports expanded significantly (10% cumulatively), jumping 7.7 p.p. to a new record high as a percentage of GDP.

[16] The program's social and political developments are analysed in Torres and Lebre de Freitas (2019).

The fall in unit labour costs in 2012 was partly accounted for by the suspension of the thirteenth and fourteenth monthly components of the public sector wage bill. These cuts were ruled illegal by the Portuguese Constitutional Court, however, and so average nominal wages and the real exchange rate increased again in 2013. The recovery of wage competitiveness also faced a major setback when the government failed to implement a proposed fiscal devaluation. Notwithstanding, nominal earnings decreased again in 2014 and virtually stagnated in 2015, delivering a further depreciation of the real exchange rate.

The rapid adjustment of business sector wages could be somehow unexpected in a context of very low inflation, and where nominal wage cuts are prohibited by law. In the case of workers that kept their jobs, nominal wages did not decline, but wage freezes became widespread during the crisis (Martins and Portugal, 2019). This was not, however, enough to avoid an unprecedented increase in separation rates. These, in turn, fed the decline in average nominal wages: according to Felix and Portugal (2019), employment restructuring and labour mobility played an important role in real wage adjustment, with new firms and new hires paying significantly below the average. It seems, though, that creative destruction somehow accelerated the required adjustment in real wages.

Before exiting the program, the economy was already recovering, supported by a more favourable external environment. From 2012 until 2015, Brent oil prices fell 53% in USD. This terms of trade improvement led to a 5% fall in the WRER, adding to the real exchange rate depreciation that had been achieved thanks to wage moderation.[17] By 2015, the economy was approaching internal balance with a declining unemployment and a negative wage gap.

After the 2015 elections, the main policy challenge was economic recovery while keeping public finances on track. Although the structure of government expenditure and revenues was adjusted to accommodate the government' political support, the twenty-first Constitutional Government managed to drive the general deficit below the 3% benchmark level in 2016. In June 2017, Portugal exited the EDP. The structural primary balance deteriorated slightly during 2015-2017, but market confidence was restored, and yields approached risk free levels in a context of unprecedented monetary easing by the ECB. Real wages recovered slowly, allowing the wage gap to remain negative, as had similarly been the case at the outset of the 1983-84 stabilization program. By 2017, the Portuguese economy already had a positive output gap and was returning to zone 1.

[17] Portugal also benefitted from political turmoil in competing tourism destinations, namely North Africa. Tourism activity picked up and created the incentives for quality improvements, in a virtuous cycle. All else being equal, the warranted real wage should have improved more during that period.

Table 3 – Main Macroeconomic Indicators (1995-2017)

	Source	Unit	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Real GDP growth	EC	% ch	2.3	3.5	4.4	4.8	3.9	3.8	1.9	0.8	-0.9	1.8	0.8	1.6	2.5	0.3	-3.1	1.7	-1.7	-4.1	-0.9	0.8	1.8	2.0	3.5
TFP Growth	EC	% ch	1.7	1.2	1.2	1.2	1.1	0.6	-0.8	-0.8	-1.4	1.3	0.2	0.5	1.6	-0.7	-1.9	2.2	-0.6	-1.3	1.2	0.2	1.1	1.2	1.5
Output Gap (Potencial)	EC	%	-1.0	-0.3	0.8	2.0	2.5	3.0	2.1	0.8	-1.5	-1.0	-1.2	-0.5	1.2	0.9	-2.1	-0.4	-1.5	-4.4	-4.5	-3.6	-2.3	-1.2	0.9
Output Gap (EU15)	EC	%	-1.1	-1.4	-0.7	0.0	0.6	1.9	1.7	0.8	-0.1	0.2	0.2	1.5	2.5	1.4	-3.7	-2.4	-1.5	-2.4	-2.9	-2.2	-1.4	-0.7	0.2
Unemployment rate (total)	EC	%	7.9	8.0	7.5	6.1	5.5	5.1	5.1	6.2	7.4	7.8	8.8	8.9	9.1	8.8	10.7	12.0	12.9	15.8	16.4	14.1	12.6	11.2	9.0
Empl: manuf./(services+constr.)	EC	Ratio	0.36	0.36	0.35	0.33	0.32	0.31	0.30	0.29	0.28	0.26	0.25	0.24	0.24	0.23	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
CPI inflation	EC	% change	4.2	3.1	2.3	2.6	2.3	2.9	4.4	3.6	3.2	2.4	2.3	3.1	2.5	2.6	-0.8	1.4	3.7	2.8	0.3	-0.3	0.5	0.6	1.4
Nominal compensation p/employee	EC	% ch	10.3	6.1	5.7	5.9	5.1	6.0	4.2	3.6	3.2	3.3	4.7	1.8	3.4	2.6	2.4	2.0	-1.9	-3.1	3.5	-1.8	0.3	1.2	2.3
ULC (total economy)	EC	% ch	7.0	4.2	3.9	3.8	2.8	4.3	4.0	3.2	3.1	0.7	3.4	0.6	0.9	2.7	2.8	-1.1	-2.1	-3.1	1.5	-1.2	-0.1	0.8	2.1
Labour share	EC	% GDP	66.5	67.7	67.7	68.0	67.7	68.2	68.3	68.0	67.7	66.7	67.3	66.0	64.5	64.8	64.7	64.0	63.1	61.5	61.0	60.2	59.4	59.0	59.6
Nominal exchange rate (EUR)	EC	% ch	-0.4	-0.2	1.4	1.6	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ULC (relative to EU15)	EC	1995=100	92.4	95.2	96.4	97.8	98.6	100.0	102.1	103.3	106.0	104.7	106.6	105.5	104.3	104.9	104.8	103.6	101.2	96.1	97.3	95.3	94.0	96.0	97.9
WRER ULC			99.5	98.7	98.9	100.7	99.5	96.5	97.8	98.5	99.1	98.6	96.9	96.3	96.9	95.8	98.9	97.6	96.2	96.1	97.4	98.6	101.0	101.9	101.8
RER Gap		%	-7.1	-3.6	-2.5	-2.9	-0.9	3.6	4.4	4.8	6.9	6.2	10.0	9.5	7.7	9.5	6.0	6.1	5.2	-0.1	-0.1	-3.4	-7.0	-5.8	-3.8
Exports of goods and services	EC	% ch	13.6	5.7	7.3	8.1	3.5	8.5	2.3	3.3	5.0	3.6	0.3	12.4	6.4	-0.4	-10.0	9.2	6.9	3.1	7.2	4.3	6.3	4.4	8.4
Imports of goods and services	EC	% ch	9.4	5.9	10.3	14.6	9.0	5.5	1.0	-0.3	-0.2	7.4	2.2	7.6	5.6	2.2	-9.5	7.8	-6.2	-6.3	4.7	7.9	8.0	5.0	8.1
Current account	BP	%GDP	-3.4	-4.5	-6.2	-7.6	-8.8	-10.8	-10.1	-8.6	-6.6	-8.2	-9.8	-10.0	-9.7	-12.2	-9.8	-10.3	-5.1	-1.8	1.0	-0.1	0.0	0.6	1.0
Capital Account	BP	%GDP	2.5	2.0	2.5	2.1	2.1	1.4	1.5	1.9	2.2	1.7	1.4	1.2	1.1	1.2	1.1	1.4	1.5	2.0	1.6	1.3	1.2	0.9	0.8
FDI (net)	BP	%GDP	0.7	1.0	1.7	2.1	0.7	5.6	5.1	1.2	4.8	0.9	1.1	5.2	1.2	1.4	0.7	1.2	3.0	3.8	3.7	2.1	3.8	2.5	3.1
Fundamental Balance		% GDP	0.7	-4.1	-4.2	-5.0	-7.6	-3.5	-3.1	-5.7	-0.8	-5.9	-6.9	-2.1	-5.4	-7.1	-5.7	-5.8	-0.1	4.8	6.7	4.5	7.0	5.9	6.7
Energy deficit	M.Econ.	%GDP	1.6	1.7	1.9	1.4	1.8	3.0	2.8	2.5	2.5	2.8	3.8	3.8	3.6	4.6	2.8	3.4	4.2	4.7	3.7	3.6	2.3	1.7	2.2
Brent oil Price	EIA	USD	17.0	20.7	19.1	12.7	18.0	28.5	24.4	25.0	28.8	38.3	54.5	65.1	72.4	97.3	61.7	79.5	111.3	111.7	108.7	98.9	52.4	43.7	54.2
Real oil price (GDP defl.)		1990s=1	0.8	1.0	1.0	0.7	0.9	1.7	1.4	1.3	1.2	1.5	2.0	2.3	2.3	2.8	1.9	2.5	3.3	3.6	3.3	3.0	1.9	1.5	1.8
Energy deficit (constant prices)		1990s=1	2.0	1.7	1.9	2.1	1.9	1.8	2.0	1.9	2.0	1.9	1.9	1.6	1.6	1.6	1.5	1.3	1.3	1.3	1.1	1.2	1.2	1.1	1.2
Terms of trade effect		%GDP	-0.4	0.0	0.0	-0.7	-0.1	1.2	0.8	0.6	0.5	0.9	1.9	2.1	2.0	2.9	1.3	2.0	2.9	3.4	2.6	2.4	1.1	0.6	1.0
Households savings	BP/EC	%GDP	10.8	9.9	9.5	10.4	10.0	9.2	9.4	9.3	9.0	8.0	7.2	5.9	5.1	5.0	8.4	6.8	6.3	7.2	6.8	4.8	4.9	4.9	4.5
Corporate savings	BP/EC	% GDP	11.2	10.4	9.9	9.4	8.4	7.8	8.9	8.0	9.6	9.4	8.7	7.9	8.3	7.0	8.3	9.3	11.5	10.9	11.7	12.3	11.9	12.0	12.7
Government savings	BP/EC	% GDP	-1.2	-0.3	0.9	0.9	1.8	0.9	-0.2	0.1	-2.1	-1.7	-2.3	-0.9	0.0	-0.5	-5.7	-5.3	-4.2	-4.2	-2.8	-1.9	-0.9	-0.5	1.0
Gross Fixed Capital Formation	BP/EC	% GDP	24.2	24.4	26.5	28.3	29.0	28.8	28.2	25.9	23.1	23.8	23.4	22.9	23.1	23.6	20.8	21.1	18.6	15.6	14.6	15.3	15.8	15.8	17.2
Of which: dewllings	EC	%GDP	7.3	7.1	7.5	7.8	8.0	8.2	7.8	7.4	6.2	6.0	6.0	5.6	5.2	4.7	4.1	3.6	3.3	3.0	2.5	2.5	2.4	2.6	2.8
Government: net lending	EC	%GDP	-5.2	-4.7	-3.7	-4.4	-3.0	-3.2	-4.8	-3.3	-5.7	-6.2	-6.1	-4.2	-2.9	-3.7	-9.9	-11.4	-7.7	-6.2	-5.1	-7.4	-4.4	-1.9	-3.0
Gov. primary balance (cycl.adj.)	EC	% GDP	0.9	0.2	-0.3	-2.3	-1.4	-1.8	-2.9	-0.9	-2.2	-3.1	-2.9	-1.2	-0.6	-1.1	-5.8	-8.3	-2.5	1.0	2.1	-0.5	1.4	2.9	0.4
Gen. government gross debt	EC	% GDP	58.3	59.5	55.2	51.8	51.1	54.2	57.4	60.0	63.9	67.1	72.2	73.7	72.7	75.6	87.8	100.2	114.4	129.0	131.4	132.9	131.2	131.5	126.0
Government bond yields	EC	%	11.5	8.6	6.4	4.9	4.8	5.6	5.2	5.0	4.2	4.1	3.4	3.9	4.4	4.5	4.2	5.4	10.2	10.6	6.3	3.8	2.4	3.2	3.1
Private sector debt (MIP)	EC	% GDP	81.5	87.9	94.4	108.9	124.5	137.1	149.8	155.9	162.0	165.8	171.4	176.5	185.0	196.2	204.2	201.5	204.1	210.3	202.4	190.5	179.4	170.3	163.5
Net Int. Investment Position	EC	% GDP		-12.9	-14.8	-24.4	-34.0	-41.5	-49.0	-58.4	-62.4	-66.7	-69.9	-79.3	-88.8	-95.1	-107.9	-104.3	-100.7	-116.5	-116.3	-118.6	-113.2	-106.1	-105.7

7. Conclusion

In this article, we revisited the tool developed by Paul Krugman and Jorge Braga de Macedo to study the adjustment of the Portuguese economy in the aftermath of the 1974 Revolution, though using a different estimation method. We updated their analysis and used their framework to review the recent crisis and adjustment program.

Overall, our findings give support the Braga de Macedo (1990) view that, following a phase of unrealistic wage setting immediately after the 1974 Revolution, real wages have remained relatively flexible. For most of the 1990s and early 2000s, the share of labour in national income displayed no trend, and real wages increased on par with productivity, on average. Moreover, when unemployment soared after 2005, the labour share in income started declining, revealing flexibility even in a context of very low inflation. It is true that much of the adjustment in average earnings during the crisis was achieved through worker mobility and creative destruction. Still, the Blanchard (2007) view that Portugal would be doomed to a long process of acquiring competitiveness through disinflation did not materialize.

We do find, however, evidence of departures of the real wage from the level that would be consistent with full employment and external balance. These departures were related to changes in the relative price of non-tradable goods that went along with swings in aggregate demand, as well as with changes in terms of trade. Before the crisis, persistent capital inflows drove the real exchange rate gap to a maximum in 2005, of similar magnitude to the one observed in 1981. At the outset of the adjustment program, terms of trade improved significantly, which created a buffer for real wages to recover in the years to come.

While recent deviations of real wages from the levels consistent with external and internal balance have been smaller than those observed after the 1974 Revolution, we found the diagram to be extremely useful in interpreting the subsequent path of the Portuguese economy. As when it was created, it remains a powerful visual tool to understand the constraints and to evaluate the policy options for stabilization in a small open economy like Portugal.

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Appendix A – Data

Our primary sources of data are the Bank of Portugal (BP) and the European Commission's Annual Macroeconomic Database (AMECO). All bilateral and "foreign" variables are measured with respect to the EU15, including West Germany prior to reunification.

1. *Fundamental Account* – The Fundamental Account (FA) balance is defined as the primary current account deficit plus net foreign direct investment inflows, and is computed as the sum of the following components: (i) trade balance, (ii) secondary income balance, and (iii) foreign direct investment. Post 1995 data is taken from BPStat (the BP's statistical warehouse). Pre-1995 data is taken from the BP's Historical Time Series (*Series Longas*). All variables are measured at current prices and then divided by GDP at current prices from the same sources.
2. *Output Gap* – Output gap series are taken from AMECO (series: AVGDGDP). Foreign output gap is measured for EU15 (including West Germany) up until 1991 and EU15 (including unified Germany) from 1991 onwards.
3. *Real Exchange Rate* – Our benchmark measure of the real exchange rate is taken from AMECO (series: XUNRQ), relative to the rest of the EU15 (with double export weights).
4. *Oil prices* – Historical series for oil prices are taken from BP (Crude Oil), in USD. Historical EUR-USD and PTE-USD exchange rates are then used to convert these prices to current PTE. Historical series for the Portuguese GDP deflator, obtained from the BP, are then used to compute real oil prices.
5. *Terms of Trade* – Taken from AMECO, index for terms of trade for goods and services (series: APGS).